Zhe Sun

The Village Finland Website

with Joomla

Helsinki Metropolia University of Applied Sciences

Bachelor of Engineering

Information Technology

Thesis

23 May 2013

Helsinki Metropolia University of Applied Sciences

Author(s) Title Number of Pages Date	Zhe Sun The Village Finland Website with Joomla 37 pages 23 May 2013
Degree	Bachelor of Engineering
Degree Programme	Information Technology
Specialisation option	Information Systems
Instructor(s)	Jaana Holvikivi, Principal Lecturer

The goal of this final year project was to build an experimental website that would provide an interactive community for both foreigners and natives in Finland. The main functionalities were planned to include a blog function, social function, groups and events function, buy and sell function, jobs function and question and answer function.

The task was to build a content management system website using the open source software Joomla application. The project also required knowledge and many skills in different areas of web development. PHP was used as a server side scripting language, MySQL was used for database design and Apache was used as a web server. The web application consisted of simple HTML pages with CSS.

The results of the thesis show that Joomla content management system is an efficient method of building a content management system website. The results also show the advantages of various aspects of the Joomla software. The website provides the users with an integrated network to communicate with each other, and to share experiences and knowledge of how they survive in Finland. The website can also help users to find information for solving particular problems in their life. Many things were learnt during this project, such as how to plan a project concept based on requirements, how to configure the server back-end and how to use Joomla content management system to create a website. The project also taught how to deal and manage the challenges encountered at the workplace.

Keywords	Joomla, web development, open source, on-line forum for foreigners, content management system

Contents

Abbreviations

CMS	Content Management System
CMA	Content Management Application
CDA	Content Delivery Application
HTML	Hypertext Markup Language
PHP	Hypertext Preprocessor
SQL	Structured Query Language
WSDM	Web Services Distributed Management
SEO	Search Engine Optimization
WYSIWYG	What You See Is What You Get
RDBMS	Relational Database Management System
ANSI	American National Standards Institute
HTTP	Hypertext Transfer Protocol
API	Application Programming Interface
FTP	File Transfer Protocol
SEF	Search Engine Friendly
CSS	Cascading Style Sheet

1 Introduction

This final year project is based on a six-month employment at Infusion Oy and adopting Joomla content management system for web development. This project was a team project with eight people. The goal of the project was to build an experimental website, The Village Finland, that would provide an interactive community for both foreigners and natives in Finland. The idea was that the information on the site would be visible to everyone but only members can contribute with information, write comments etc. People would join the community because of the valuable information achieved through other members' personal experience.

The target users of the website are families, students, professionals, authorities, existing community, and tourists. The main functionalities include a blog function, social function, groups and events functions, buy and sell function, jobs function and question and answer function.

This Bachelor's thesis focuses on the application of the Joomla content management system, consisting of PHP script language, MySQL database, and Apache server, and on the website design and implementation. In this thesis, the theory aspect is covered in chapter two, which describes on one hand the Joomla content management system, and on the other hand the details, features and comparisons of popular content management systems software. Moreover, the background, development, and technology behind Joomla are presented. The thesis also discusses the benefits of Joomla for enterprises, and, finally, Joomla site security. Chapter three explains the whole project, including the concept, structure and the design of the website. Chapters four, five and six form the empirical part of this Bachelor's thesis that documents the Joomla system installation and configuration, the main functionalities of the website and, finally, the website testing. The final outcome of the project is presented as the last part of the thesis. The challenges faced in the development of the project are discussed.

My role in this project was to plan the concept of the project on the basis of the requirements, configure the server back-end, and Joomla content management system. I was also in charge of testing, bug fixing, configuration, and change management.

2 Joomla Content Management System

Joomla is a website content management system for web development. A Content Management System (CMS) is a tool that allows modifying and publishing the content of a website. All websites that require content managing, such as blogs, images, and news benefit from using a content management system. CMS is not only able to manage texts, documents, and images, but it can also manage videos, flash animations and other content. [1]

2.1 Content Management Systems

Basically, the content management system consists of two elements, Content Management Application (CMA) and Content Delivery Application (CDA). The CMA allows the web manager or author, who may be of non-technical staff, to update, upload and delete content from the website without needing the expertise of a web developer. It does not require the web manager to know HTML (Hypertext Markup Language), PHP (Hypertext Preprocessor) script programming language, and SQL (Structured Query Language) to manage the database.[2] The CMS has a wide usage range: many websites are built with CMS, including personal websites, government websites, school websites, enterprise websites and commercial portals. There are many types of CMS, according to the scope of system application, such as an Enterprise Content Management System (Enterprise CMS), a Web Content Management System (Web CMS) and a Component Content Management System (Component CMS). The various CMS types can be divided into framework development and system application tools according to the type of system application. Depending on the system applicability, the systems can also be divided according to their emphasis on back-end management, style design or front-end management.

2.1.1 Features of Content Management Systems

There are 7 major features that make the CMS:

1. A choice of templates that speed up web site development, and reduce development costs, such as procedures and templates separation technology, which means that the development process can be done without changing the template on the website. [2]

2. Management of texts, images, flash animation, video, and even e-mail files. In addition to content classification and release management, different content for different types of users can be published. [2]
3. Editability of user interface which means that the user interface and style modules can be customized according to client requirements. [2]
4. A chance for Web Services Distributed Management (WSDM), where site management personnel and maintenance personnel can be in different locations, while the Internet allows them to achieve high efficiency governance from anywhere. [2]
5. An index of all data on the company site so that it can then be searched with keywords which the content management system retrieves. Content management systems are generally designed for search engine optimization, including the directory structure, file names, titles, and keywords. [2]
6. Mostly open source application. [2]
7. No strong skills required. Since non-professional web programming techniques are offered, users can easily manage the entire system without any professional training. [2]

2.1.2 Content Management System Software

There are many commonly used open source content management system software worldwide as shown in figure 1. The ten commonly used are Wordpress, Joomla, Drupal, Typo3, MODx, DotNetNuke, Movable Type, Concrete5, Liferay, and Pligg as shown in figure 1. The most popular blogging platforms are Wordpress and Movable Type because of features vital for blog designers, such as appeal, themes, tags and support for multiple users. Drupal and Joomla are mostly used to build web portals because they have huge libraries, professional standards, internationalization and customization. Pligg platforms are popular for social networking sites, as Pligg provides social bookmarking functionality for sites, allowing users to post links, vote and leave comments. [3]

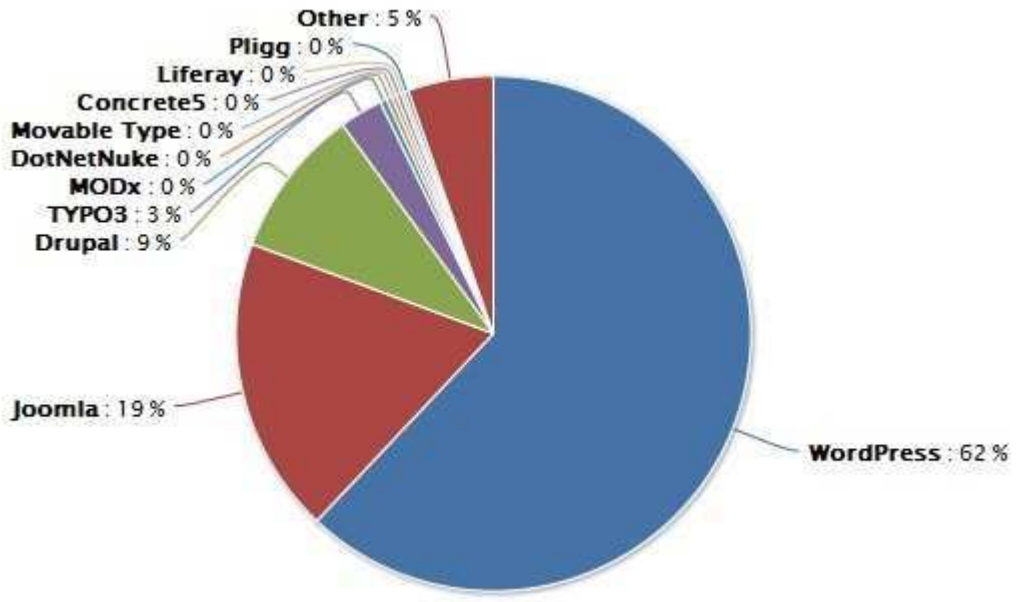


Figure 1: Market Share of top 10 Open Source CMS [4]

There are various particular aspects to consider when choosing a content management system. As there are many options in the market, the choice depends on the organization's expectations, aims and the purpose of the website.

2.2 Joomla Overview

The name Joomla comes from the African Swahili language word "Jumla", which means "together" (All together) or "as a whole". Joomla is developed by an award-winning team with a separate portal formation, spawned from Mambo. The members of the group are about 150, including developers, designers, system administrators and document authors, as well as the participation of more than 20,000 members online. In 2005, Joomla released the first version 1.0.x, Joomla has developed into quite a famous content management system. The latest version Joomla 3.1 was released on April 24, 2013. It has several new features including tagging. [5]

Joomla is an open source content management system software package to create dynamic content-based websites. Joomla is designed to work with script language PHP, and interacts with the front-end information through MySQL database in the back-end. Joomla consists of modules, components and plug-ins, and it can run on different platforms, such as Linux, Windows and Mac. A web application built with Joomla as the

content management system is always divided into two separate websites, the front-end and the back-end as shown in figure 2. While the front-end represents the typical website to the world, the back-end is responsible for the internal management of the web application itself. This includes the management of users and user groups, menus, content, and also extensions. [6]

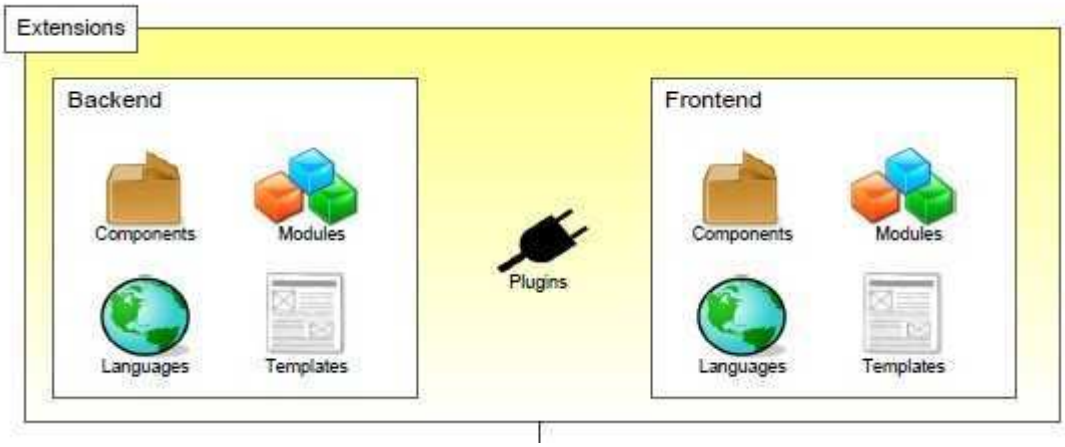


Figure 2: Joomla Extensions Structure [6]

Joomla delivers a professional level website empowered by many extensions suitable for both personal and business websites. Users can add functional extensions through the plug-in module, such as replacing the template, forum, guestbook, wiki, blog, stream video, online store, picture gallery, or jobs.

The four basic features of Joomla CMS are the use of advanced web technology, a huge add-on package and business opportunities, simple and abundant user interface, altitudinal customization and development flexibility. The details are explained below:

1. Use of advanced web technology:

Joomla uses many new technologies for site progress, such as Web caching technology that can speed up the responsiveness and performance of the site. RSS news feed is a popular website news reading technology and used commonly by blog programs. SEO (Search Engine Optimization) is one of the necessary technologies on all sites. This function is mainly designed to allow search engines browse data on the website easily, so that more people will find the site through the search engines, which means more readers and business opportunities to the site. [7]

2. Huge add-on package and business opportunities:

There are add-on package and graphic design sets from thousands of different sites around the world that are developed based on Joomla. Users can install these add-on packages easily, and there are various software options and graphic design themes available for Joomla development. [7]

3. Simple and abundant user interface:

Joomla user interface not only emphasizes appearance, but its designers also spent a lot of effort in designing simple operability of the interfaces. With a variety of WYSIWYG (What You See Is What You Get) editing program, it allows non-technical administrators to manage and edit articles easily on the site. [7]

4. Altitudinal customization and development flexibility:

For web application developers and designers, Joomla retains much flexibility for customization and integration capabilities. [7]

2.3 The Technology behind Joomla

In order to install Joomla on a local PC, it is necessary to set up a network environment, an installed and functioning web server such as Apache, a database system such as MySQL and a server side script language such as PHP. To build such an environment, users need to install Joomla, Apache, MySQL and PHP as either remote host or Localhost. A remote host is accessed via the Internet, it is set up locally on a PC or on a server in a company's Intranet, or space for it can be rented or purchased from a dedicated web-hosting firm. A localhost is a web server and associated database that is set up directly on a PC or on a local network at home, and allows the users a direct access to the computer upon which the Joomla, Apache, MySQL and PHP reside. For the Localhost, there are a number of integrated software packages that put all the necessary software together in one package that is integrated with Apache, PHP, MySQL, and Perl tools. It allows users to perform the installation without a lot of technical knowledge. There are several integrated software package suites for different operating systems, WAMP is for Windows, LAMP is for Linux, MAMP is for Apple Mac and XAMPP is a multi-platform which means it is compatible with all of the above. [7]

2.3.1 Script Language PHP

PHP stands for Hypertext Preprocessor, it is an open source server side script language that is used for web development. Text, HTML, and JavaScript code can be em-

bedded into PHP files. PHP code can be executed on the server, such as generating dynamic website content, and creating, reading, and writing files on the server, collecting form data, modifying data in a database, sending and receiving cookies. Its result can be returned to the browser as HTML. PHP is available for many different platforms, such as Linux, Windows, Unix and Mac. PHP supports various databases, and it is compatible with many servers, such as Apache and IIS. [8, 6-16]

2.3.2 MySQL Database System

MySQL is an open source Relational Database Management System (RDBMS) which is used on the web and runs on a server. The MySQL database system uses the most commonly used database management language SQL (Structured Query Language) for database management and compiles on a number of platforms. SQL is an ANSI (American National Standards Institute) standard that allows a user to access and manipulate databases. SQL can retrieve data and delete records from a database, insert and update records, as well as create new databases, tables, stored procedures and views in a database. MySQL has attracted much attention because of its speed, reliability and adaptability. If the case does not require transaction processing, MySQL might be the best choice for content management. [8, 7-24]

2.3.3 Apache Web Server

Apache HTTP (Hypertext Transfer Protocol) Server is an open-source HTTP server developed by Apache Software Foundation. It runs on most computer operating systems. Due to its multi-platform and security features, Apache HTTP Server is one of the most popular web server software options. It is fast, reliable and can be expanded through a simple API (Application Programming Interface), compiles Perl or Python interpreter into the server. A user can create a web server with daily page views by millions of people. Apache is designed to be a complete and portable FTP (File Transfer Protocol) server engine solution based on currently available open protocols. FtpServer can be run standalone as a Windows service or Unix/Linux daemon, or embedded into a Java application. [8, 6-11]

2.4 Benefits for Enterprises

An organization, especially an enterprise, can get many benefits if they use Joomla CMS as seen in the list below:

1. Open source software
   It is free of charge. An enterprise can use Joomla to build a website without the cost of a software license. The components associated with Joomla, PHP, MySQL and Apache are also free of charge. It reduces the cost of a website project. [7]
2. User-friendly interface
   There are many Joomla templates available in the market, or the user can create a unique template for the enterprise. [7]
3. Strong applicability
   Joomla is easy to use with full functionality. Joomla ensures the efficiency of the management staff, makes the information publishing fast and accurate, and administrator can effectively manage the site visitors' login permissions, increases site security and ensures the safety and stability of the site. Joomla allows non-technical administrators to manage or edit the contents of the site, in order to reduce site maintenance and customer support costs. [7]
4. Customization
   The users belong to different groups that have different permissions to write, modify, and publish. A specified user can be allowed to access or manage a specified part or content. This function helps to store and retrieve data quickly and easily, to reduce duplication of information, and to increase site flexibility. [7]

2.5 Joomla Site Security

Joomla is a content management system that is used worldwide. For this reason, hackers often try to find a way to hack a Joomla website. There is a list of instructions for protecting Joomla application and improving Joomla website security below:

1. The latest Joomla security update can be used
   A latest version of Joomla and the extensions can be updated. Many vulnerabilities and bugs are resolved in later versions. [9]
2. The administrators can only use secure third party extensions and keep them updated
   Most often when a Joomla website has been hacked, the security problem has had nothing to do with Joomla itself. In most cases, the hacker had come in through an

unsecure third party extension that the site owner had installed. When a new extension is installed, the administrator needs to remove the version numbers or names of extensions. [9]

3. A secure password can be used for Joomla administrators
   A complicated administrator password can be used, and the password can be changed frequently. [9]
4. The use of a SEF component makes the Joomla more secure
   A SEF (Search Engine Friendly) component is used to make the url:s of the Joomla website more search engine friendly and it also gives security benefits. Most hackers use the Google inurl to search for a vulnerable code. The Artio or SH404SEF can be used to re-write the URL and prevent hackers from finding the code. [9]
5. A MySQL root user can not be used as the user of the database
   When user creates a new database for a Joomla installation is created, it is recommended to re-create an administrator user for the database, and assign permissions to the administrator user. A new user can only access and manage the site corresponding to the database, rather than the entire MySQL root privileges. [9]
6. A Joomla site needs to be backed up frequently
   A backup means not only the backup of the database, but also a backup of the file system. A website needs a regular file system backup. Installation of the backup components helps administrators to back up the site easily. [9]
7. The default database prefix (jos_) can be changed
   When installing Joomla, the default data table prefix is jos_. Few people modify the prefix, which leads to the unfortunate situation where a jos_ prefix data table can be successfully attacked by a hacker in most cases. Therefore, it is recommended that a custom table prefix is selected, so that a lot of automated attacks can be avoided. [9]
8. The leftover files can be deleted
   All the extensions that user do not use can be uninstalled. [9]
9. The file permissions can be changed to restrict editing or overwriting
   File permissions on some critical files can be restricted to make it harder for a hacker to edit or overwrite the files. [9]
10. The Joomla Administrator's Security Checklist needs to be followed
    The Joomla Administrator's Security Checklist is specifically proposed by the Joomla team, and users should not ignore its authority and importance. [9]

3 Project for The Village Finland Website

The implementation of The Village Finland website consisted of three phases which were planning the concept, creating the structure and designing the template.

3.1 Concept of the Website

The aim of The Village Finland Website project was to create an interactive community between foreigners, locals and expatriates in Finland. There are always some difficulties when moving to a new country. Expatriates need to find information to survive in the Finnish society, therefore the community is directed to foreigners, but locals are also welcome to contribute. Information is visible to everyone but only members can contribute, post articles, write comments etc. People will use the community because of the valuable information based on other members' personal experience. That makes the Village Finland website a top-of-mind online meeting place and information provider.

3.2 Structure of the Website

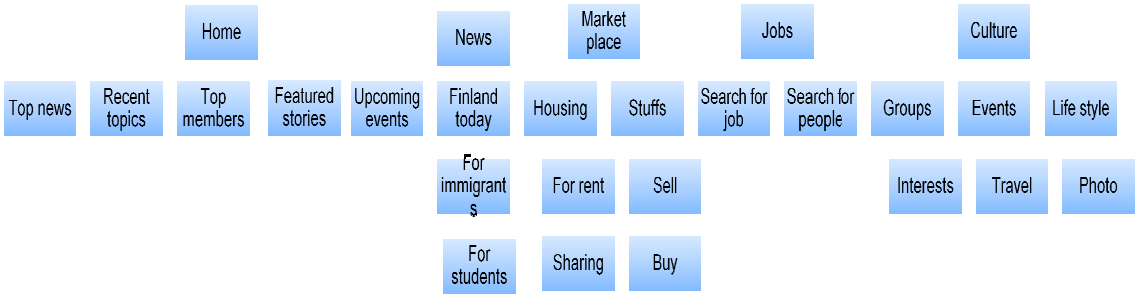
The potential users of The Village Finland website can be divided into six groups as shown in table 1: families, students and professionals, who want information from the site; authorities and existing communities who can provide information to the site; and tourists who, although first-timers, are not very potential for The Village Finland at least during their first visit.

Table 1: Customer Analysis of the site

	Who are they?	What they interested in	They offer
Families	Husbands and wives Relatives Come to live in Finland for a long time (potential students and professionals)	Housing (rental, furniture, car, pets) Procedures (residence permit, legal system) Jobs Culture (events, meeting people, networking) Education	Volunteer Networking Experience
Students	Young people who come to Finland for education Stay for a short time (go back to their country after graduating) Stay for a long time (stay in Finland to work)	Culture Part-time jobs Housing and such (where to buy cheap things, sales.) Travelling Residence permit Further education	Sharing experience, hints Culture diversity
Professionals	Come to Finland for business purpose. Stay a short time, unless they decide to set up a family in Finland.	Full-time jobs Residence permit Culture (networking and dating) Housing Further education	Networking
Potential visitors	Tourists People come to Finland occasionally to visit friends or families Professionals on business trip Stay in Finland for only a short time	Culture (events, sightseeing) Transportation Local security	Cultural diversity Newcomers
Authorities	Employment Offices	Cultural diversity Stable society Happy citizens	Official information Up-to-date news
Existing communities	Religious communities (Christians, Buddhists, Muslims) National communities Professional communities (students, workers) Same interest communities (fan clubs)	Cultural exchange Systematic content management Chance to attract new members Information	Members Unique information (special events)

Table 2 shows the structure of the website. In the home page there are some main sections such as top news, recent topics, top members, featured stories, and upcoming events. The news page includes local Finish news (Yle.fi), and maybe some news for immigrants and students. In the market place, there is information about houses for rent or for sale, or things for sale, for users to find. The jobs page is built for both job seekers and employee seekers. There are also some other functions that can be achieved on the website, events can be created, groups joined, travel experience and photos shared.

Table 2: Website Structure



3.3 Design of the Website

The look of The Village Finland website should be attractive and get the visitors to stay longer on the web page. The website should also be easy to use and information easy to find. The design should be unique, credible, professional, colorful and user-friendly. The goal of the Village Finland website should be to bring interesting information for both natives and foreigners.

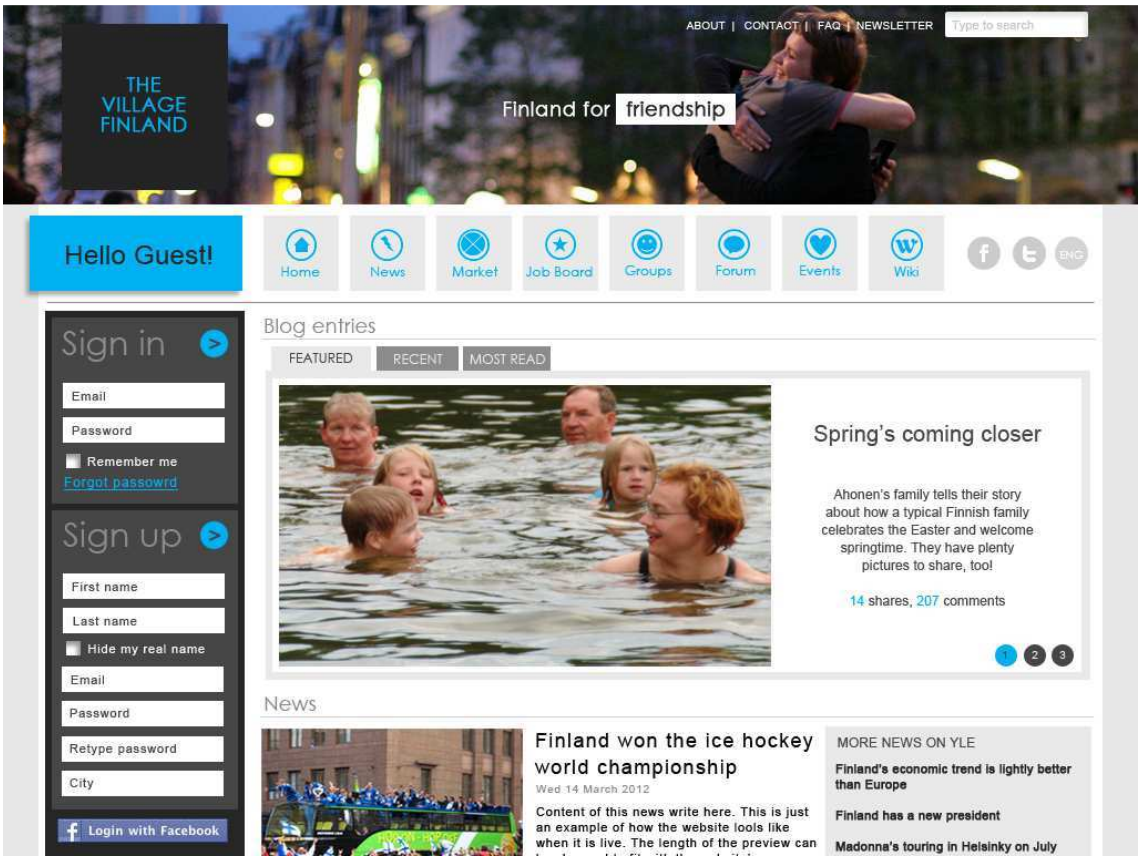


Figure 3: Website Template Draft

The website template draft is shown as figure 3. Based on the information gathered during the planning phase about their needs, the design should accommodate blog entries, news, events, members, as well as the website logo.

In the template detail, shown as figure 4, the banner is placed at the top (the gray area). Its size is to be 1600x262, to fit all desktop widths. However, the main page will cover a part of the banner. The width of the main page is always 960. The length is flexible, according to how much contents the site has. In normal mode, the menu buttons will have grey background and blue texts or icon. When the user points the mouse or clicks on one of the buttons, the text will turn black. The size of the *welcome member* board is 192x78. It will have 20 pixels outside of the main page. The space between the *welcome member* board and the first button is 10 pixels. The range between each menu button is 8 pixels. The member panel is 180 pixels, and the function panel is 240 pixels.

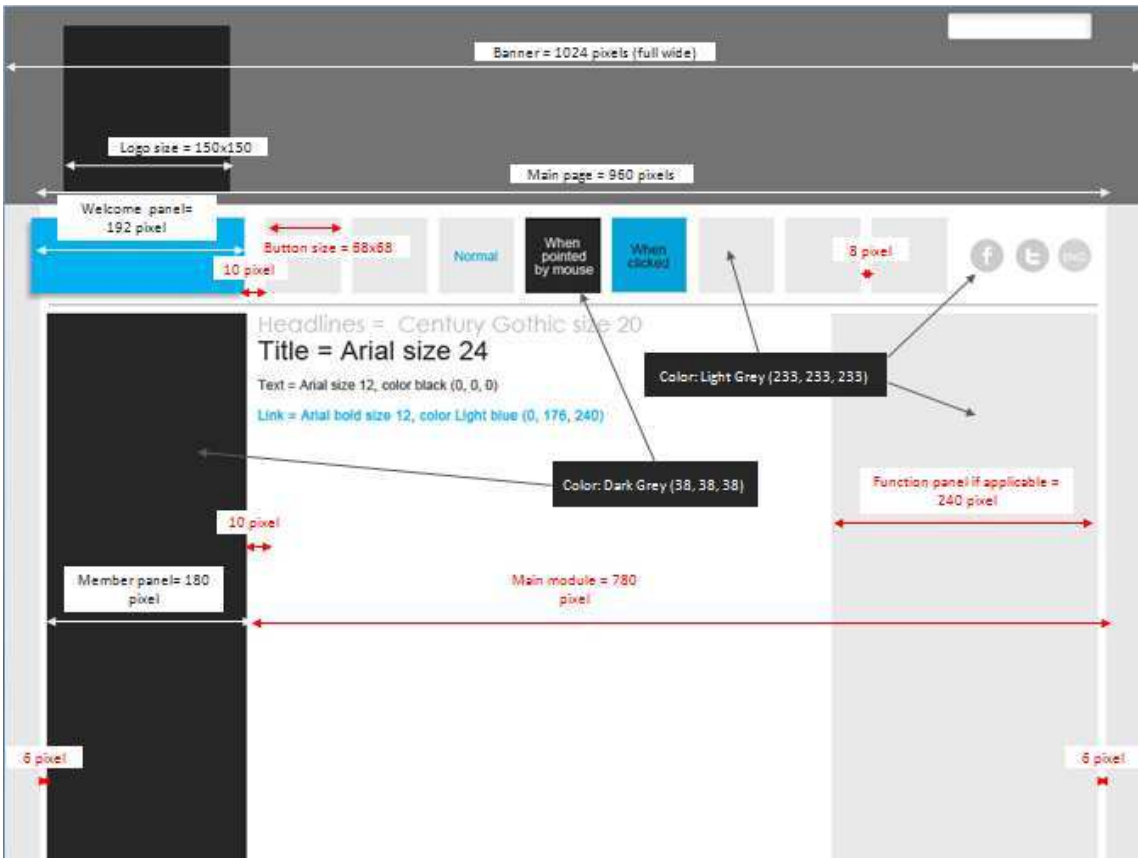


Figure 4: Template Detail

4 Joomla System Configuration

The first step of using CMS to create a website is to install Joomla, and Joomla configuration is the most important foundation for implementing various functions of the Joomla software.

4.1 Joomla Installation

The Village Finland website used the Joomla version 2.5.X. In order to install Joomla successfully on the website, what was needed was a web host was needed, a web server, such as Apache, a database such as MySQL, and a server side scripting language, such as PHP. With the latest version of Joomla installation files transferred to the server, access to the installation was provided through a web browser by entering

the address of the site. After the complete installation of Joomla, the installation directory should be deleted, otherwise it will leave a security risk on the site.

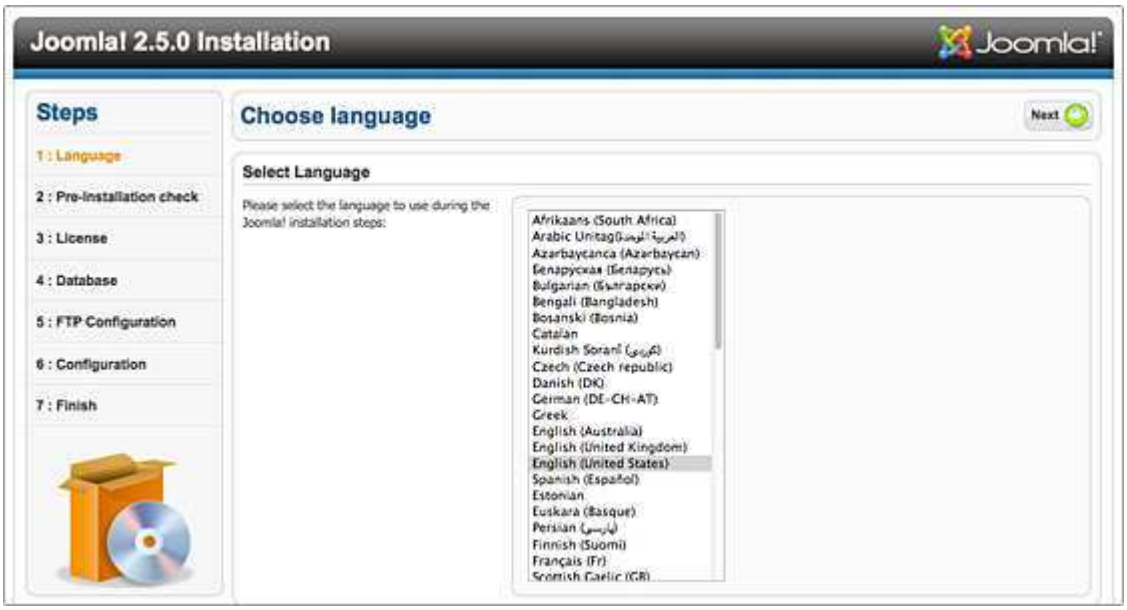


Figure 5: Joomla web installer

When Joomla was installed, the package was first put under the directory called *httpdocs* on the server, then run the browser was run with the address of the site, and the web installer of Joomla appeared like in the figure 5, and to complete the installation, follow the steps of the installation guide were followed.

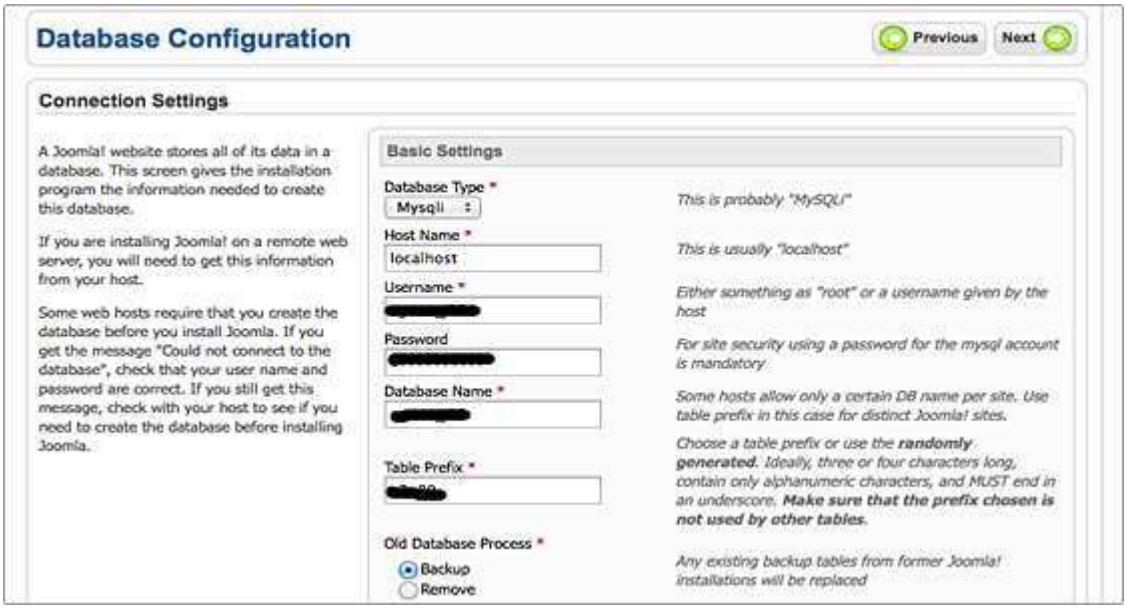


Figure 6: Database configuration

The database was configured as well, in order to make the Joomla application work properly. Database type, hostname, user name, database name and the database prefix were set up, when connecting to the database as shown in figure 6. For the Village Finland site, the database type is *Mysqli,* hostname can be set as *localhost*.

Figure 7: Joomla successfully installed

To complete the installation, the installation folder was removed from the directory, in order to access the new Joomla 2.5 web site and administrator as shown in figure 7.

4.2 Joomla Configuration

In the back-end of the Joomla software, there are many functions that need to be configured, such as the control panel, user manager, menu manager, content manager, components manager, and extension manager

4.2.1 Joomla Control Panel

Joomla has a powerful back-end management system, shown to the administrator as Joomla control panel after log in. It contains all the functionalities of the Joomla: global configuration, user manager, menu manager, content manager, components manager, and extension manager. The global configuration in figure 8 is the area of the Joomla

administrative interface where a user with super administrator attributes is able to make changes that globally affect the behaviour of the website and can also modify some default settings for accessing to site content [10].

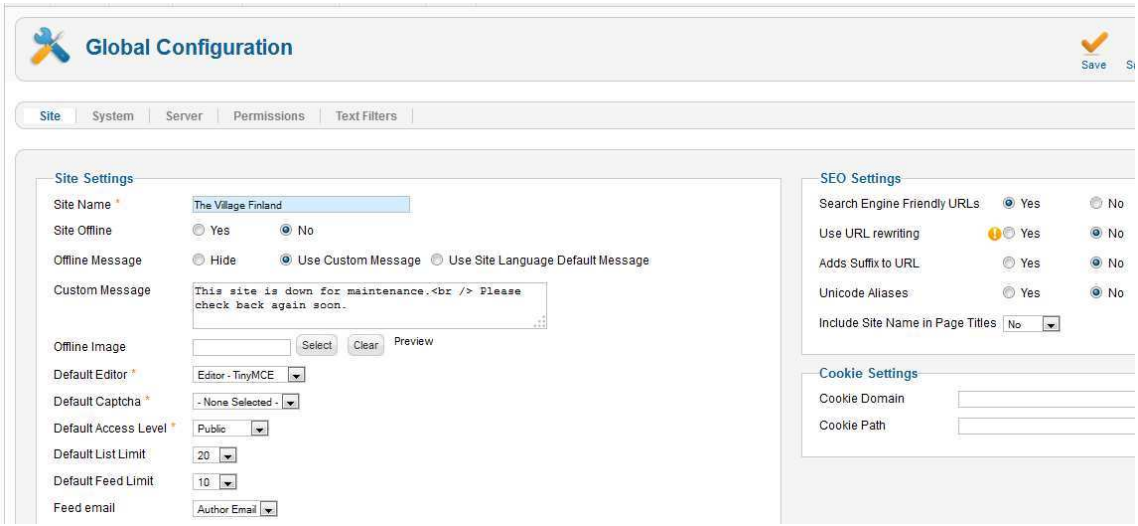


Figure 8: Global Configuration

All the parameters under the site, that is the system, server, permissions, and text filter tabs in the global configuration, are stored as values in the file *configuration.php*, which is found in the root folder of a Joomla installation. To be able to save the current choice or any contents changes of the site configuration, the file *configuration.php* and the other directories' permissions (log directory or temp directory etc) need to be set as *writeable*, in order to for the file to be editable for all the possible functions in the back-end of the Joomla website, After updating, the permission is changed to *unwriteable* as a security precaution (only the *configuration.php* file needs to be changed).

The control panel contains several quick link icons for the web developer to build a Joomla website: add a new article article manager, user manager, category manager, menu manager, media manager, extension manager, module manager, template manager, language manager and global configuration. The site construction is basically implemented on these platforms. They are discussed below.

4.2.2 User Manager

The user manager is where the users of the site are managed as shown in figure 9. The user group controls what actions a user may take on the site and which objects a user can view. The user manager gives administrator the ability to look at a list of users and sort them in different ways, even edit and create users. The administrator is able to edit and create users, groups and access levels. The user notes are pieces of information which can be assigned to registered users on the website. These notes can contain for example comments about “offending” or “difficult” users etc. [7]

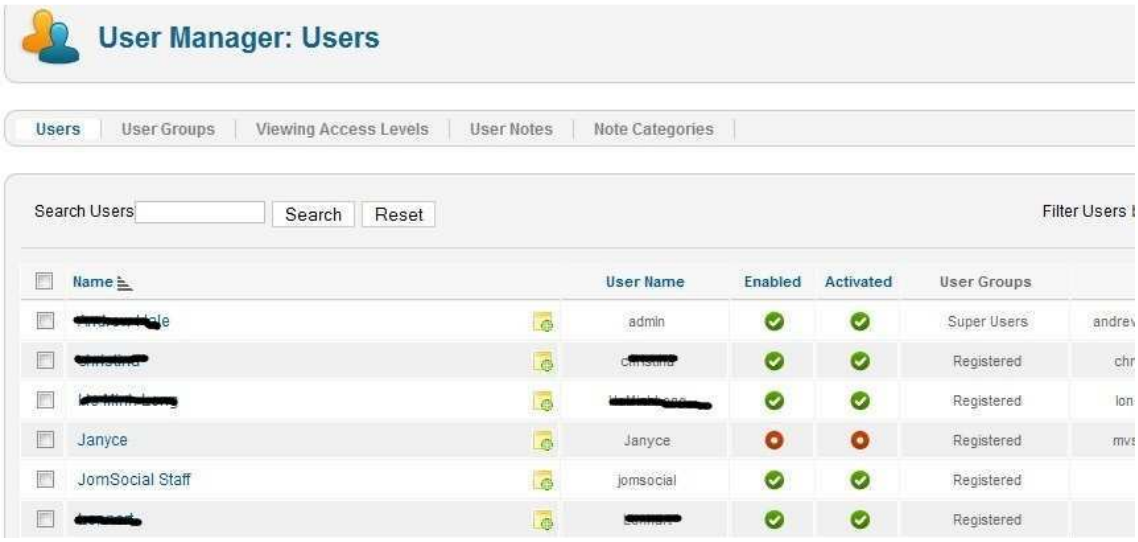


Figure 9: User Manager

4.2.3 Menu Manager

Figure 10 shows the menu manager. Menus are groups of links to categories, content items, components or external pages. The administrator can access the content of the website by using an identification name, and the content becomes visible on the site when a main menu module that references it is published.

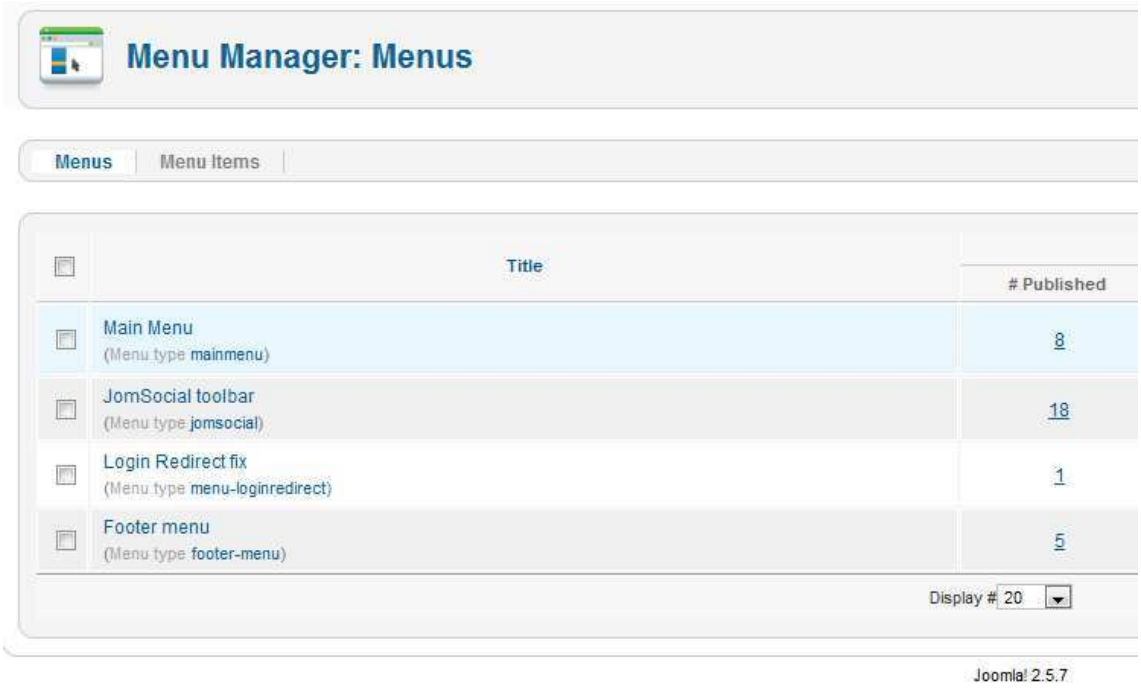


Figure 10: Menu Manager

In order to create or edit a menu item, a menu type, menu title and a description of the menu item is needed.

4.2.4 Content Manager

The content manager consists of an article manager, category manager and media manager. The article manager allows a user to create a new article without knowing any HTML, since Joomla has all the ready-made features for this function as shown in figure 11. With this function, it is easy for a web developer or non-technical staff to edit, delete, update or unpublish an article [7]. This function also helps managing a big amount of articles on the website.

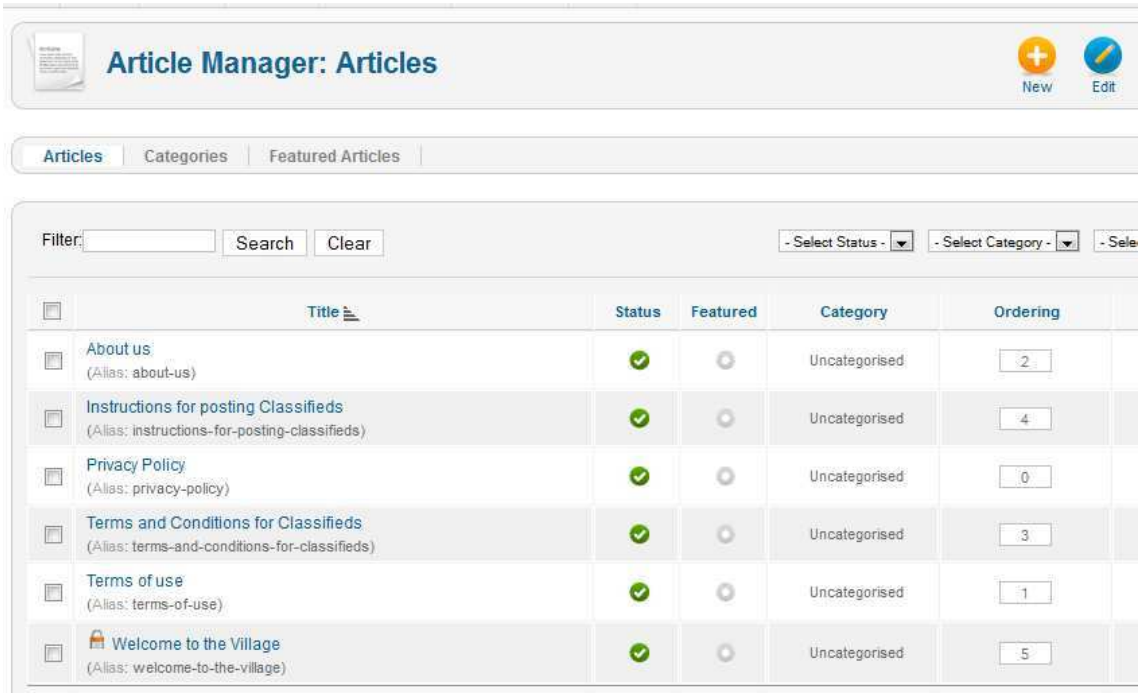


Figure 11: Article Manager

The category manager includes the title of category, published or unpublished status, order, access level, and category ID. The category of the articles on the website are managed with it as shown in figure 12.

Figure 12: Category Manager

There are four main tasks that the media manager performs. It creates or deletes directories which store media files and image files, uploads media content to any folder, or

deletes existing files in the directory. Only the super administrator will have full access to the functions mentioned above. Depending on the rights, the interface in Joomla is different.

4.2.5 Components Manager

Joomla back-end provides a unified component management platform for managing the components used on the website, Joomla default components are banners, contacts, Joomla update, messaging, newsfeeds, redirect, search, smart search, and weblinks. It also allows the web manager to install other extensive components on the site to extend the functionality of the website. Joomla components provide extensive functionality of all the extensions. The components can completely alter the functionality and look of a Joomla-powered website. For example, with just one component the administrator can turn part of the Joomla into an online store, forum or photo gallery. [7]

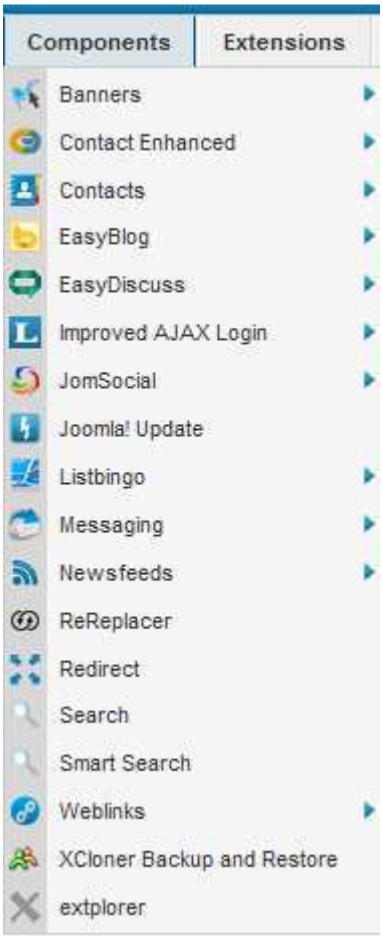


Figure 13: Components of the site installed

All the extensions which were installed on the Village Finland website are displayed in the component section as shown in figure 13.

4.2.6 Extensions Manager

This section explains all the important functions which the Joomla application provides to the website. Joomla can be easily extended and the functionality of site customized with a module manager, plug-in manager, template manager and language manager.

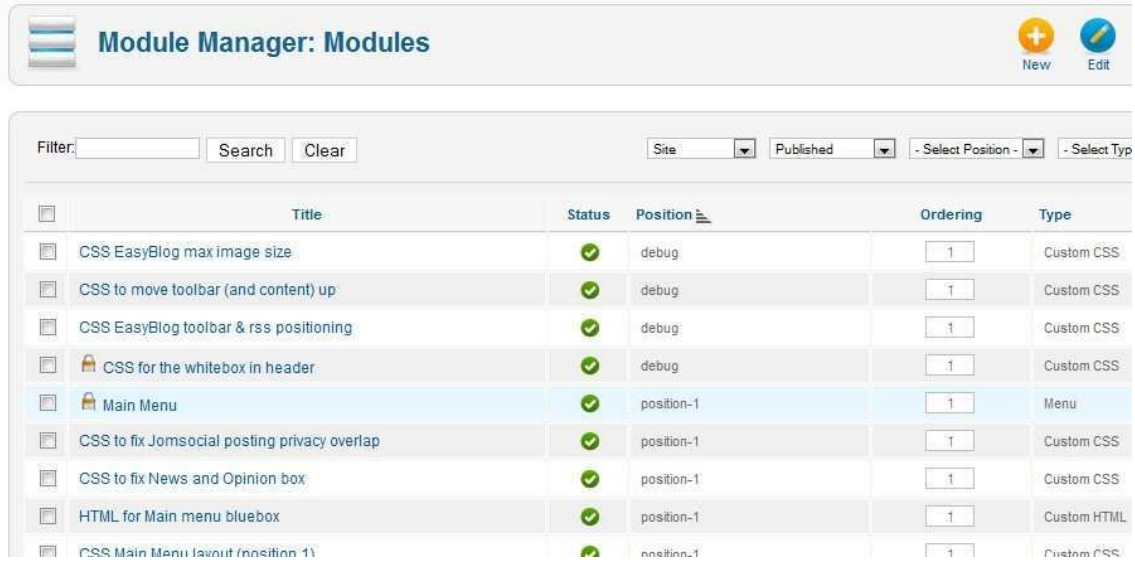


Figure 14: Module Manager

Figure 14 shows the module manager. Modules are the extensions that work together with components. Modules only persist module parameters, but persist their own data. Each module can be published in template positions or predefined blocks, and placed at multiple locations on the page template. Joomla plug-ins run in the back-end and do not show directly on the website, but are invisible to the administrator. However, plug-ins can change Joomla input or output in various ways. For example, a plug-in can be used for changing the pagination in Joomla or rewriting the URLs [7].

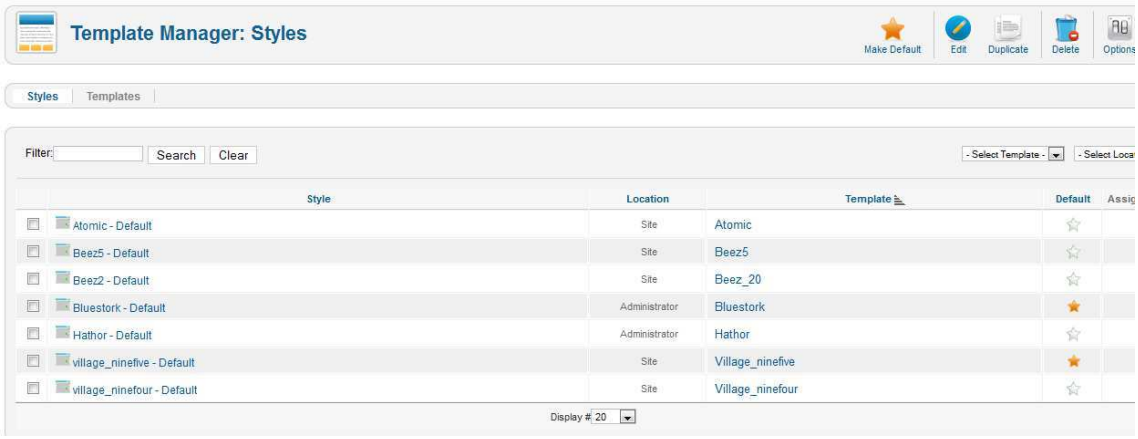


Figure 15: Template Manager

Templates are used for changing the layout of the website as shown in figure 15. Most of the templates are designed for the front-end since a back-end template is visible only for the administrator. Templates can be installed to the system just like other extensions through the extension manager, and managed in the back-end of the website. All the extensions play a significant role in the Joomla website. [7]

5 Functionality of the Website

The Village Finland website has many useful functions in order to provide an integrated network for its users. The users can communicate with each other by sharing information, such as articles, photos, videos.

5.1 Blog Section

The blog section was the most important functionality on the Village Finland website. For this project we used the EasyBlog extension as the development tool. EasyBlog is an all-in-one tool to start a blog on a Joomla website. It contains all the main tools for blogging, such as team blogging, featured blogs, social media sharing, comments system, trackbacks, reports, feeds, and subscriptions. It supports basic blog functions and allows the administrator to migrate blogs from Joomla default articles or from other blog extensions. It also supports multiple bloggers, can share blogs to social media like Facebook, Google+, LinkedIn, Twitter, and display comments and news from other web-

sites via feed imports. Additionally, it has the functionality for controlling spam comments with a built-in captcha tool that supports recaptcha. [11]

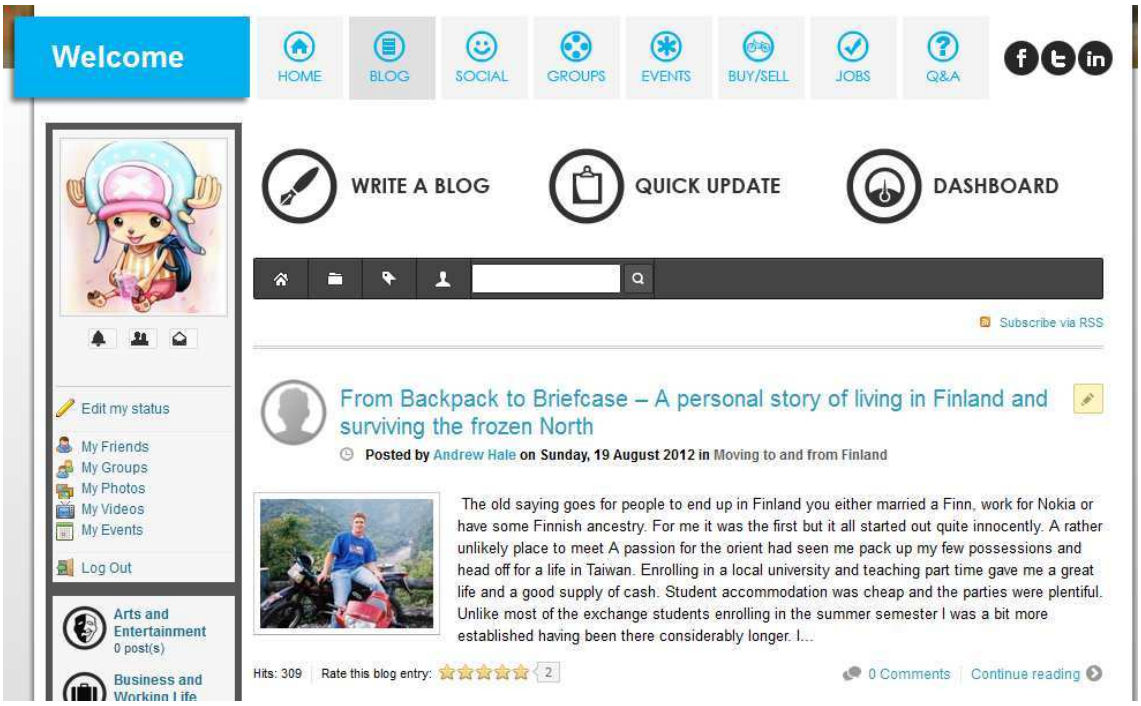


Figure 16: Blog Section

For example, figure 16 displays the blog section of the Village Finland website. There is a blog tool bar on the page in order to allow the user to do any actions conveniently, such as checking the home page, blog category, tags, bloggers and the search field. There are also several templates for the blog section, the page displays the users' blogs with a title, avatar, user name, category, publish time, hits, rate, and comment. Figure 16 shows three big icons under the main menu, which are the quick link icons on the website. Their purpose is to encourage the users to actually use the broad icons.

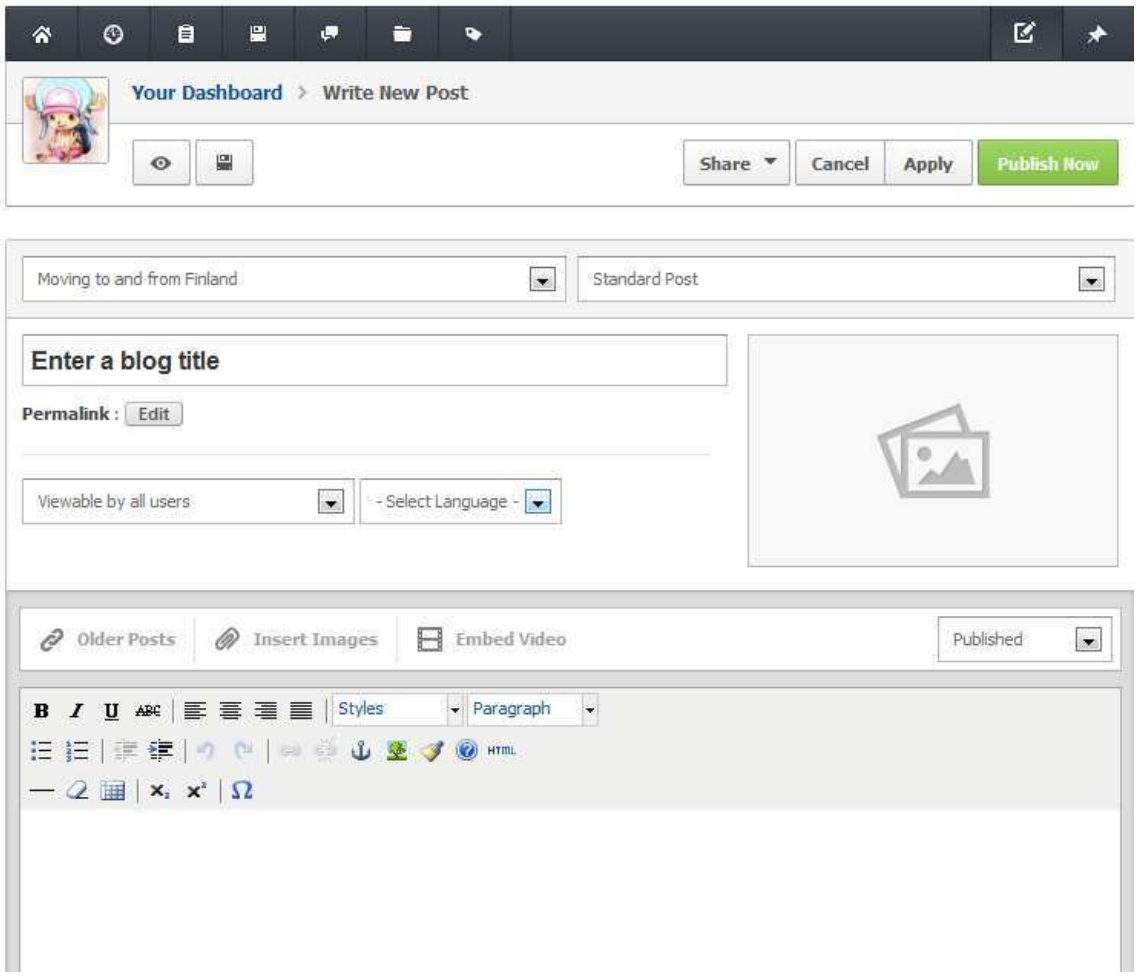


Figure 17: Add new article

Only the administrators and registered users have the rights to post or edit blogs. The user can post a quick article from the site by clicking the *write a blog* icon, as shown in figure 17. The user can specify which social network to share the blog post to before publishing. Images can be resized, captioned and renamed in the new media manager, the third party commenting plug-ins and the built-in comments manager can be used, on them. These functions can be managed in dashboard at any time [11].

5.2 Social Section

The social section mainly performs a social networking function, such as making new friends, voicing out opinions, sharing pictures and videos, creating and managing events. Jomsocial is designed to quickly build a member base, create users' social environment and customize their own community, whether the website is for business community, sports fans, gamers or other online communities. This component contains

custom profiles, multiple profiles, users, user points, groups, group categories, video categories, events, event categories, activities, member list. [11]

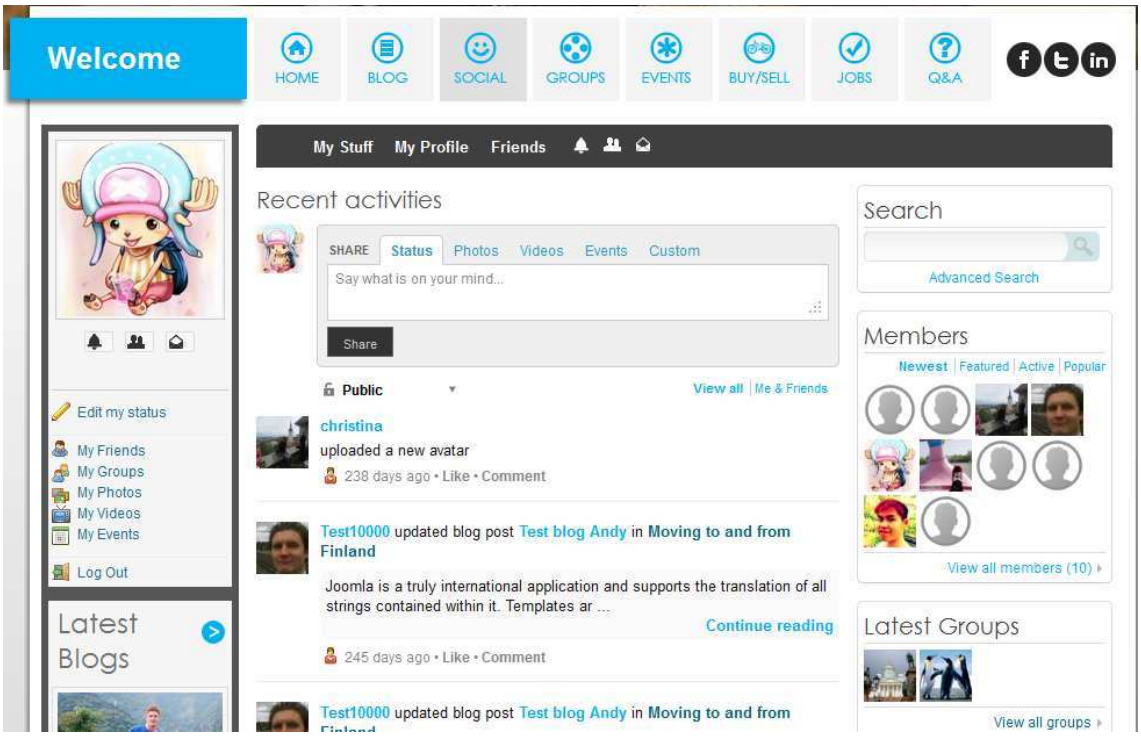


Figure 18: Social Section

The social section supports a friendship system as shown in figure 18. The user can send a friend request to any member of the site the same way as can be done on other social media websites. The social section also has a Facebook friend inviter. In this section, users can share their status, photos, videos and events, there is also a 'Like' and 'Comment' on the activity stream. Users can also edit their profiles by using the block on the left side or by clicking *My Profile* on the tool bar.

5.3 Groups and Events Section

Groups and events functions are basically subsidiary functions of the Jomsocial, providing group and event management and discussions. Group and event management are used to manage community activities, and discussions provide a customized level of sharing.

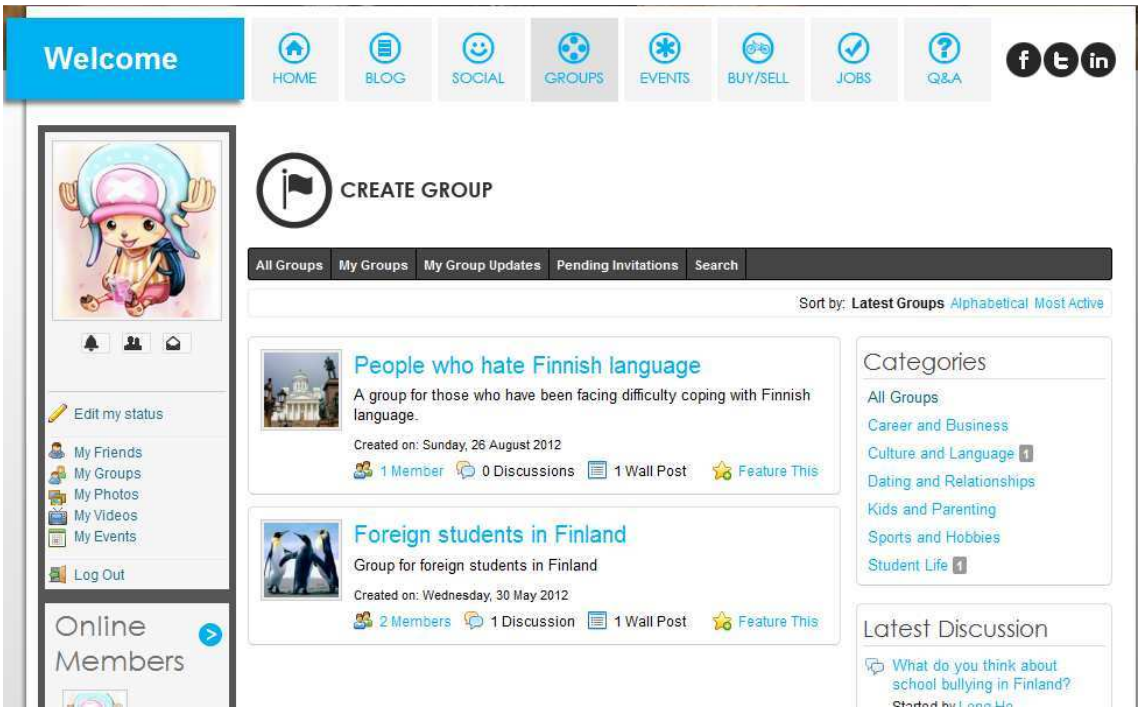


Figure 19: Groups Section

In figure 19, there are lists of all the current groups and active events on the site. This section also allows the user to create his/her own groups and events by clicking the icon *create group*, and to manage his/her current groups and events by using the tool bar. The latest discussion block is visible for every user.

Figure 20: Event Section sidebar

Figure 20 shows the sidebar on the event page. This page has a similar functionality as the group page, it also provides the function of searching a nearby event by typing the location in the text area on the *nearby* block, like *Helsinki*.

5.4 Buy and Sell Section

This function is powered by the Listbingo extension, and it allows the user to post requests or advertisements on the site. It is basically a market place for the users. *List an item* is for the user who has items to offer, for other users who want to find a suitable item there are several features to use, such as search, multiple ad posting schemes, location and category, ad type and ad condition.

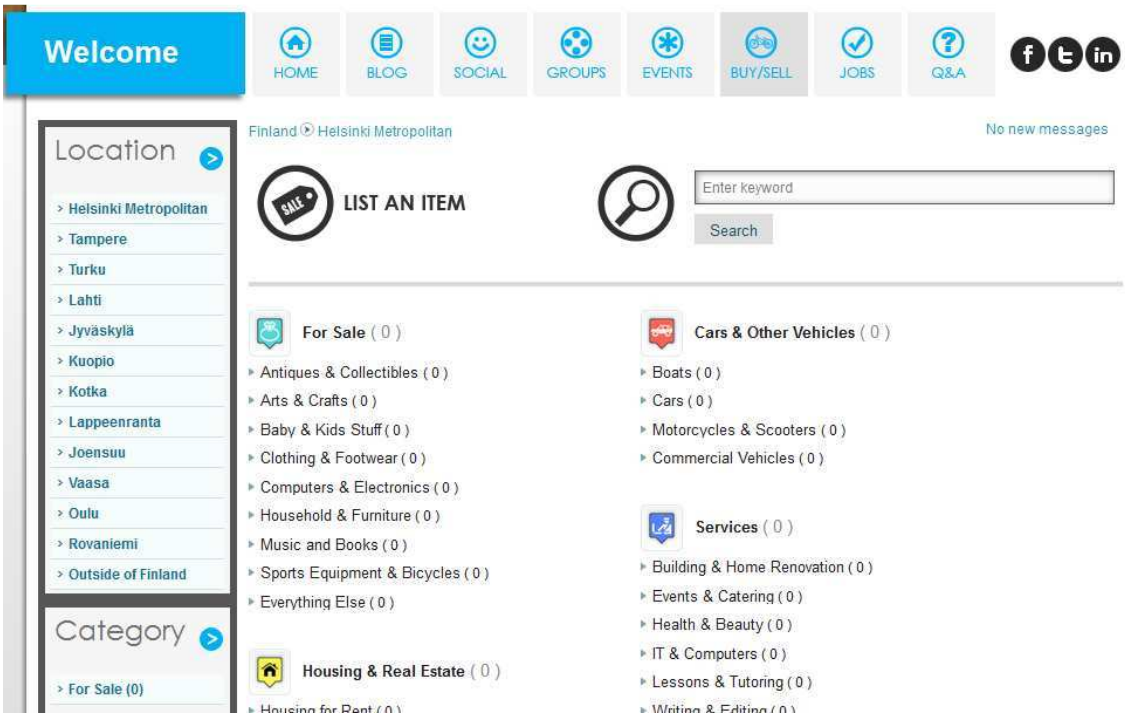


Figure 21: Buy and Sell Section

5.5 Jobs Section

The jobs section plays a significant role in this community as shown in figure 22, as this section should be the one to motivate the users to visit and use the website. It provides the job seeker with information, and links the jobs section to popular career search engines Mol.fi and Monster.fi. It helps the user to manage the information in one place, encouraging the user to use this site. This section is not only for the job seeker, but also allows employers to post a job ad, and to find a suitable person for their job.

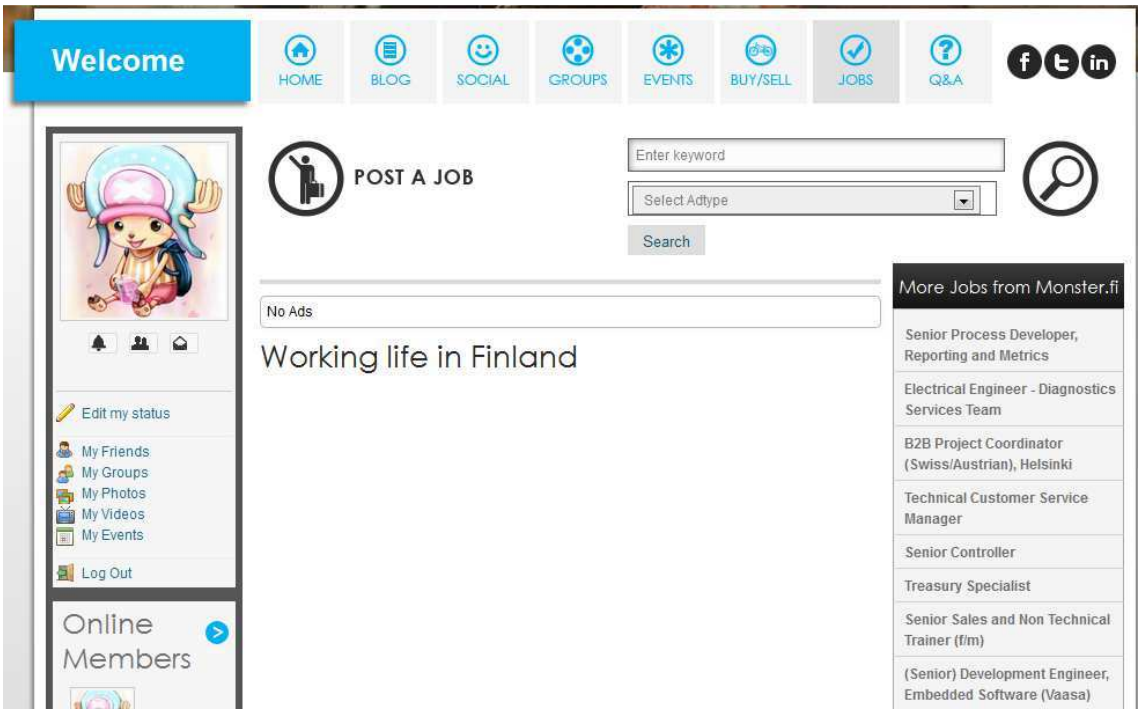


Figure 22: Jobs Section

5.6 Questions and Answers Section

EasyDiscuss is a versatile Joomla forum extension for the question and answer section, used to build an online discussion area for the users as shown in figure 23. The benefits of using a question and answer section is that it enables the administrator to manage clients inquiries, build client loyalty, build credibility, spark multiple conversations, gather valuable experience from users, or simply build a repository of information. By integrating user profiles from EasyBlog and JomSocial, EasyDiscuss has a points system to award active users by rewarding them with interesting badges. The users can use the toolbar to search, sort and manage discussions. Files, images, polls and URLs can be attached to discussions. The users can share discussions in Facebook, Google+ or other social media, and report inappropriate discussions. [11]

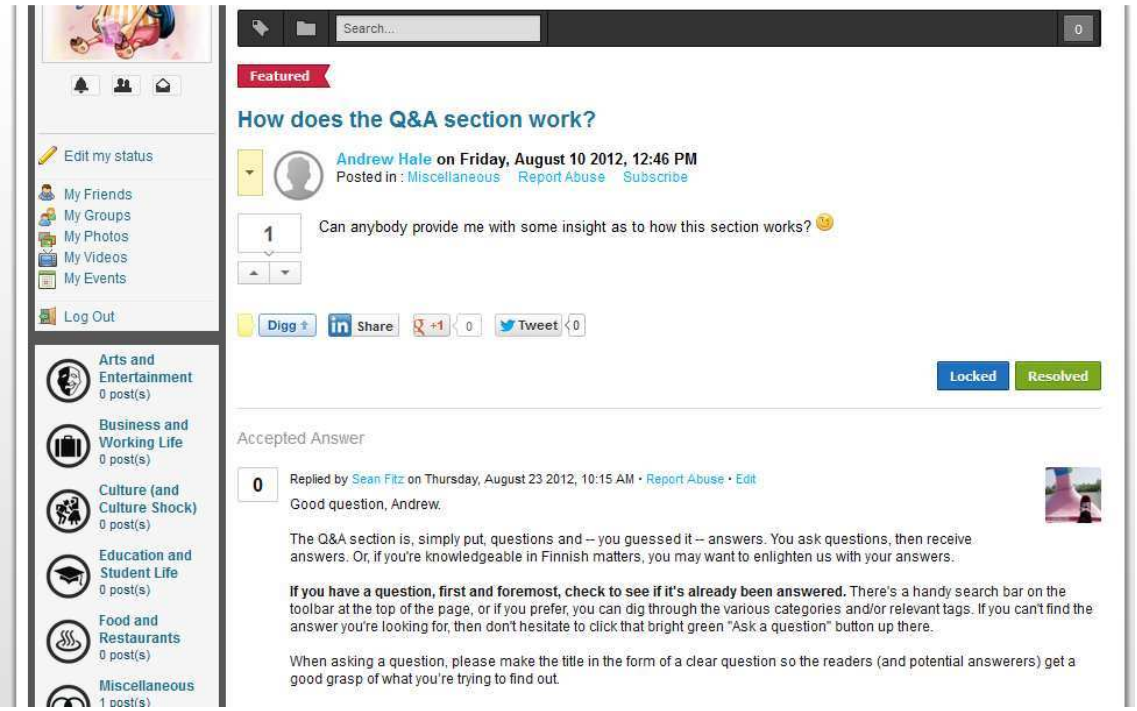


Figure 23: Questions and Answers Section

5.7 Login Form and Feedback Form

Users can be divided into two levels:

1. A general visitor has the right to view all the information provided by the website.
2. Registered users have the right to view the restricted information, to express their views on the relevancy of the information, reply to messages, exchange point of views, post information, and edit their own profile. [11]

Figure 24 shows the register form. An unregistered user can easily register by clicking the *Register* button at the top of the page. It only requires the user's name, username, email, and password, and after the site administrator verifies the user's request, the user can log in to the site by giving the username and password.

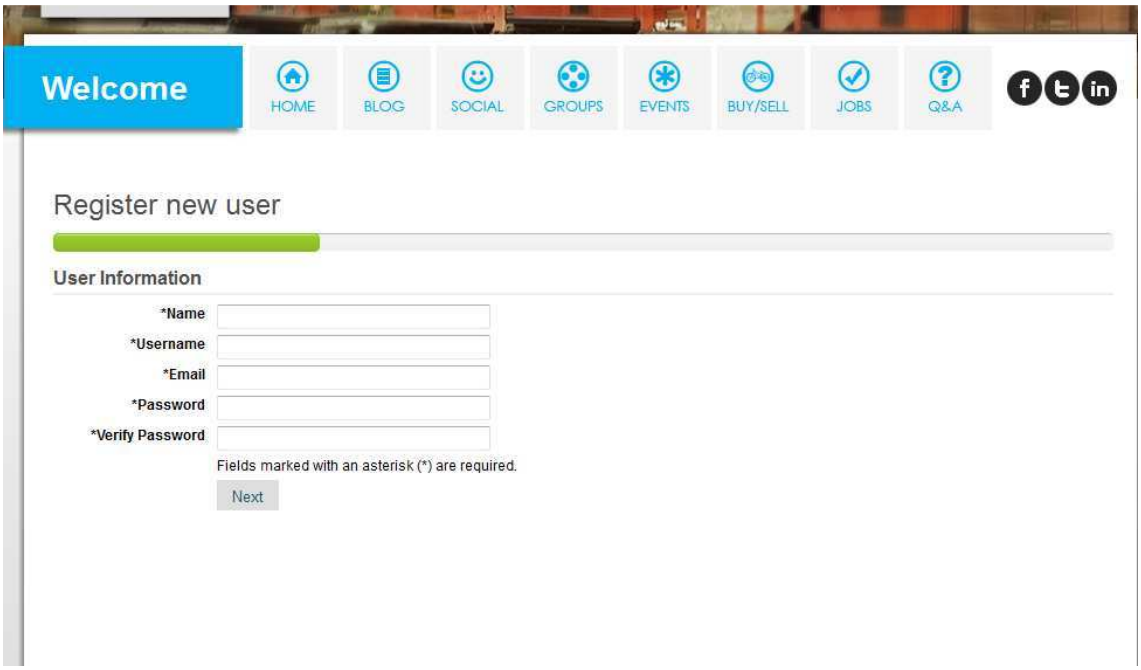


Figure 24: Register Form

A user can contact the web administrator by clicking the *feedback* located in the side-bar of the page. If the user is logged in, the administrator will get the name and email recorded in the database, preventing the user to mistype his email, as shown in figure 25. The administrator will get the users' browser, IP address, operating system and screen resolution. This function prevents robots to fill the forms, which makes the web-site safer and more reliable.

Figure 25: Feedback Form

5.8 Custom CSS

Figure 26 shows custom CSS. In order to give each page or each section a unique style from the rest of the site, Custom CSS can be used on the site. A custom CSS module can be used to broaden the scope of design by having a different background image on every page, or changing the module position, applying different fonts, font colors, column widths, hyperlink behaviour or even rollover effects. [11] Custom CSS is not only used for styling the page, but it can also adjust the deviation from the template, for example, to make fonts display inappropriately, or unnecessary border and margin, or page contents display improperly.

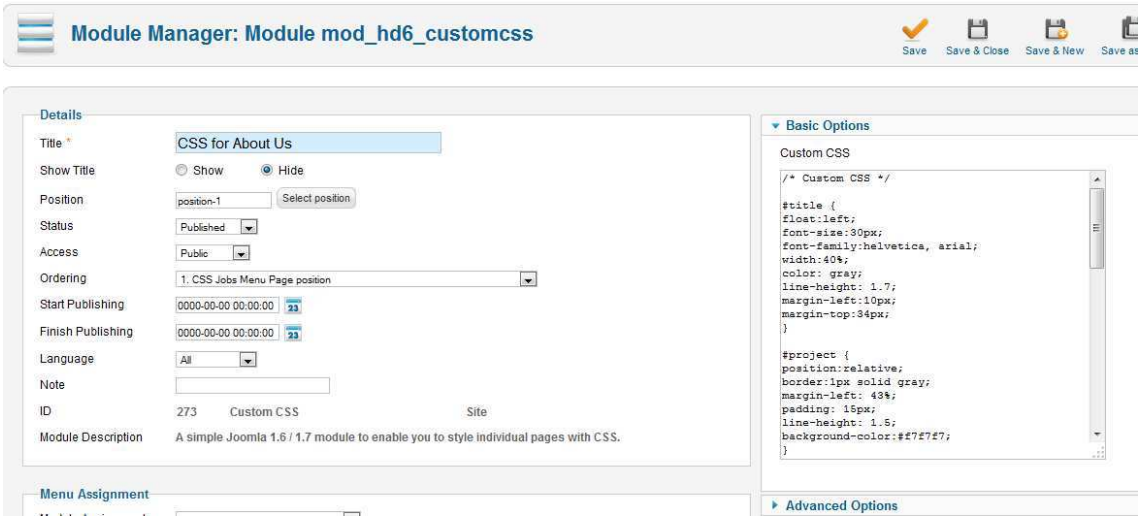


Figure 26: Custom CSS Module

5.9 Website Backup

XCloner is a website backup and restoring application, which is designed for PHP or MySQL websites as a Joomla backup component. The purpose is to give the users a possibility to clone their Joomla website and move it over the Internet to any location. Website backup allows the user or site administrator to create custom backups, such as backup files and databases, and restore them at any location. XCloner created backups based on a cron task, and the created backups can be stored on the local server, remotely through ftp, or emailed to a custom email account. [11] The purpose for using website backup is to keep a recent backup of the site, create an archive be-

fore upgrading the Joomla application, or to add a new extension, and avoid wrong modifications, or to make a site more secure.

6 System Testing

The website testing was done first by testing the browsing compatibility. The testing was done on three browsers, Google Chrome, Mozilla Firefox and Internet Explorer. An issue was encountered during the testing phase: the web page was unable to alignment in Internet Explorer. This was only to be an issue on Internet Explorer, and the issue was fixed by using a custom CSS code. In fact, there were quite a big amount of bugs fixed by using custom CSS code. Page titles and page headings, page body text, links text, images and tags were evaluated. A thorough check for dead links and missing files was done before launching, and content grammar and spellings were checked to make sure there are no mistakes on the site. Adjustments were made throughout the website. All the changes on the website and the ways bugs were fixed were recorded in an Excel document for future use, such as *footer code*, or *hide publishing options from the blog section* with custom CSS etc. The final outcome of the project is shown below as figure 27.

Figure 27: Final Outcome of the Project

7 Conclusion

The goal of the Village Finland website project was to create an interactive community for both foreigners and natives in Finland by using the open source software Joomla as the web development tool. This goal has been successfully achieved, as the template design grabs the user's attention and the content on the website is rich, and the site is easy to navigate. The project manager and other team members were satisfied with the project outcome.

The project started in February 2012, and finished at the end of August 2012. Originally, the project was to finish in July, but a dispute of the template design caused a delay. The first template got rejected because it had too many different points according to other project members. Therefore, the final website used a brand new template. The challenges I faced during the project were the technical issues in the back-end of the site. The difficult thing in Joomla was hacking into the Joomla source code file, and also configuring all the extensions that were included in the website, making them look nice when they are displayed on the website front-end.

To sum up, this project has met the specified goal, providing a full functionality to a community website with the Village Finland website as a final product. This project was also a great learning opportunity. The project required many skills in different areas of web development. PHP was used as a server side scripting language, MySQL was used for database design, and Apache was used as a web server. The web application consisted of a simple HTML page with CSS. This was the first time that I got in touch with the Joomla content management system. Now I have become familiar with the Joomla application, and I have used it to build other content management system web-sites after this project.

References

1. Maass, Wolfgang. Semantic Technologies in Content Management Systems [online]. Heidelberg, Germany: Springer Publisher; 2010.
   URL: http://link.springer.com/book/10.1007/978-3-642-24960-0/page/1
   Accessed 5 May 2013.

2. Robertson, James. So, what is a CMS? [online]. 2003.
   URL: http://www.steptwo.com.au/papers/kmc_what/index.html
   Accessed 5 May 2013.

3. Top 10 Content Management System Software Programs [online].
   URL: http://www.squidoo.com/content-management-system-software-review
   Accessed 5 May 2013.

4. Market share of top 10 Open Source CMS [online].
   URL: http://www.opensourcecms.com/general/cms-marketshare.php
   Accessed 5 May 2013.

5. Hutchinson, James. The history of Joomla!: An in-depth chat with CMS core developer, Andrew Eddie [online]. 2010.
   URL: http://www.computerworld.com.au/article/354247/history_joomla_an_in-depth_chat_cms_core_developer_andrew_eddie/
   Accessed 5 May 2013.

6. Priefer, Dennis. Reengineering and Requirements Analysis of CMS-Extensions [online]. 2010.
   URL:http://homepages.thm.de/~dprf53/forschung/Reengineering%20and%20Requirements%20Analysis%20of%20CMS-Extensions.pdf
   Accessed 5 May 2013.

7. Hagen, Graf. Joomla 2.5 – Beginner's Guide. 2012.

8. Naramore, Elizabeth, Gerner Jason. Beginning PHP5, Apache, MySQL Web Development. Indiana, United States: Wiley Publisher; February 2005.

9. Joomla! Documentation page. Security Checklist [online].
   URL: http://docs.joomla.org/Security_Checklist
   Accessed 5 May 2013.

10. Joomla! Documentation page. Introduction to Global Configuration [online].
    URL: http://docs.joomla.org/J2.5:Global_configuration
    Accessed 5 May 2013.

11. The Joomla! Extensions Directory [online].
    URL: http://extensions.joomla.org/
    Accessed 5 May 2013